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Abstract

**SOME ECONOMIC ASPECTS OF NATURAL URANIUM GRAPHITE GAS
REACTOR TYPES PRESENT STATUS AND TRENDS OF COSTS IN FRANCE**

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The first part of this report defines the economic advantages of natural uranium fuels, which are as follows : the restricted number and relatively simple fabrication processes of the fuel elements, the low cost per kWh of the finished product and the reasonable capital investments involved in this type of fuel cycle as compared to that of enriched uranium. All these factors combine to reduce the arbitrary nature of cost estimates, which is particularly marked in the case of enriched uranium (due to the complexity of its cycle and the uncertainties of plutonium prices). Finally, the wide availability of yellowcake, as opposed to the present day virtual monopoly of isotope separation, and the low cost of natural uranium stockpiling, offer appreciable guarantees in the way of security of supply and economic and political independence as compared with the use of enriched uranium.

As far as overall capital investments are concerned, it is shown that, although graphite-gas reactor costs are higher than those of light water reactors in certain capacity ranges, the situation becomes far less clear when we start taking into account, in the interest of national independence, the cost of nuclear fuel production equipment in the case of each of these types of reactor. Finally, the marginal cost of the power capacity of a graphite-gas reactor is low and its technological limitations have receded (owing particularly to the use of prestres-

sed concrete). It is a well known fact that the trend is now towards larger power station units, which means that the rentability of natural uranium graphite reactors as compared to other types of reactors will become more and more pronounced.

The second section aims at presenting a realistic short and medium term view of the fuel, running, and investment costs of French natural uranium graphite gas, reactors.

Finally, the economic goals which this type of reactor can reach in the very near future are given. It is thus shown that considerable reduction in investment costs can be obtained without relying on fuel enrichment, and that this development is accompanied moreover by improvements in the operational safety of the reactor. The economic aspects of the main technical problems entailed by these developments are discussed : loading and unloading machines blowers etc ...